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VOTER TURNOUT AND CITY PERFORMANCE

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Voter Turnout and City Performance

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Abstract

We study the impact of exogenous variation in Italian municipal elections' voter turnout rates on city performance scores and elected mayors' indicators of valence. First, we build a simple model of voluntary and costly expressive voting, where the relative weight of ideology and valence issues over voting costs determines how people vote, and if they actually turn out to vote. We show that the cost of voting depresses voter turnout, yet can raise the chances of selecting higher valence candidates and thereby improve government performance. Empirically, city performance is measured along a number of dimensions including a unique index of overall urban environmental quality, and mayors' valence is proxied by variables reflecting their professional experience and competence. The staggered nature of the municipal election schedule allows us to exploit exogenous variation in voter turnout rates through the 2000s due to the presence of concomitant regional, general and European parliament elections, and to weather conditions (rainfall) on the election day. The results from a number of specifications and quality of policy-making indicators consistently point to a negative impact of voter turnout rates on the performance of cities and the valence of mayors.

JEL classification: D72; H72; C26.

Key words: local elections; voter turnout; urban environmental quality; weather.

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1 Introduction

Low and declining voter turnout rates across the Western democracies have been a cause of concern for political observers and academics alike for decades (Reif and Shmitt, 1980; Boyd, 1981). The idea that massive vote abstention poses a threat on the nature of the democratic process, possibly altering the representation of interests of the diverse segments of society due to systematic differences in preferences for public policy between voters and nonvoters, seems to call for institutional remedies and registration/voting mechanisms aimed at boosting voters' participation (Lijphart, 1997).

However, the premise that high or nearly universal rates of voter participation are desirable, and that variation in turnout might have significant policy consequences, does not seem to be so firmly grounded either in theoretical or in empirical research. From a theoretical point of view, Borgers (2004) showed that if voting is costly and instrumentally motivated, and voters have private values (own ideological views) over candidates' position issues, turnout tends to be inefficiently high due to the fact that each voter ignores the negative pivotal externality he inflicts on the other voters when deciding to vote. Krasa and Polborn (2009) extended Borger's analysis to larger electorates and asymmetric groups: they identified a counteracting positive externality that voters from a group generate on abstainers from the same group, and stated the conditions under which mandatory voting policies can be beneficial. Within a framework where voters have both private values and commonly shared values, Ghosal and Lockwood (2009) further proved that low voter turnout resulting from an information-driven switch from private value (ideological) to common value (candidates' competence) voting might lead to better selection of agents, and be welfare increasing. Finally, Aldashev (2008) modelled the effect of the level of voter turnout on political rent accumulation in an expressive voting framework, and showed that lower turnout due to higher ideological mobility of voters actually reduces equilibrium rents by self-interested politicians, and can therefore increase welfare.

Indeed, most of the strength of the 'get out the vote' arguments arises from models where voters are heterogeneous, with wealthy and aged individuals voting in larger proportions than younger and less fortunate ones. This renders the redistributive content of public policy crucially dependent on the share, composition and skewness of the electorate that actually cast their votes. In fact, a number of recent empirical findings suggest that raising voter turnout tends to help progressive candidates, favor minority and disadvantaged groups, lead to more redistribution and welfare (pension and education) spending, and in the end contribute to fill the 'democratic deficit' of poor participation contests (Fowler, 2013; Rauh, 2014; Leon, 2013). Overall, though, the empirical evidence is mixed: even when the focus of the inquiry is on the degree of pure redistrib-

ution that can be obtained in a representative democracy system, some pieces of empirical research challenge the low turnout-poor democracy postulate, and question the desirability, or even the relevance, of an increase in voter turnout *per se* (Lutz and Marsh, 2007).

Mueller and Stratmann (2003) investigate the voter participation-demand for redistribution nexus, and find that higher turnout is accompanied by the implementation of policies that actually retard growth. Relatedly, Fumagalli and Narciso (2012) regard voter turnout as the underlying link between democratic institutions and country performance, and show that institutions that are typically accompanied by higher voter turnout (parliamentary regimes and proportional voting rules) also tend to be associated with higher redistributive spending that lowers economic growth rates. Citrin et al. (2003) assessed the partisan impact of higher turnout in Senate elections using US state-level exit polls and Census data to simulate the outcome of those elections under universal turnout. They concluded that while nonvoters are generally more likely to be Democratic than voters, very few election outcomes would have changed had everyone voted. Based on data from European election studies in 1989, 1994, 1999 and 2004, van der Eijk and van Egmond (2007) estimated that turnout size effects on parties' shares of the vote in national elections were generally small (with right-wing parties benefiting only slightly from low turnout) and happened to be decisive in only few cases. Rosema (2007) similarly concludes that, since the political sophistication of those who participate is relatively high, the typically more informed choices of those voters tend to counterbalance the imperfect representation effect due to low participation, which implies that low turnout might, in fact, improve the selection property of elections. Lutz (2007) argues that the level of information held by voters matters significantly more for the outcome of a popular (direct democracy) vote than does the level of turnout in itself, while Fisher (2007) disputes the existence of a causal effect of turnout on the left share of the vote in national elections across countries. Finally, Ferwerda (2014) exploits the gradual repeal of compulsory voting in Austria to isolate the causal effect of turnout decline on party vote share shifts, and finds a generally insignificant turnout effect in spite of large, two-digit rate declines in voter participation.

Notwithstanding the significantly larger attention devoted by the scholarly literature to the trajectory of voter turnout in parliamentary and presidential elections than in local elections (Wattenberg, 2002), the most recent years have witnessed growing academic attention towards the analysis of the impact of voter turnout on policy-making in decentralized government structures. Thanks to the increasing role of cities in terms of contribution to economic growth, business attraction and pressure on the environment, democratic participation in municipal elections in urban areas seems no less important in principle than in nationwide contests: the larger the degree of political and fiscal decentralization,

the more the pattern of participation in local elections might have an impact on the level and mix of locally provided public services and ultimately on people's welfare. In particular, in a low participation environment local communities might be more vulnerable to capture by interest groups having the most to gain and ending up with a disproportionately large representation of their own stakes (Berry, 2009).

Systematic empirical investigations in this sense, though, have been rare, due to the lack or sparsity of detailed information on local elections. Hajnal and Trounstine (2005) were among the first to offer credible evidence that the less regular voting participation of Latinos and Asian American citizens leads to their systematic under-representation on US city governing bodies, and that moving the dates of local elections to coincide with more salient national contests would substantially moderate such phenomenon. By analyzing school district elections in a number of US states and exploiting the exogenous timing of election schedules, Anzia (2011, 2012) finds that low turnout (off-cycle) elections create a strategic opportunity for organized groups (public sector unions) to pursue their private interests (raising public sector salaries). Aggeborn (2013) uses a constitutional change in Sweden in 1970 as an instrument for voter turnout in Swedish local elections, and finds that higher voter turnout yields higher municipal taxes, larger local public expenditures, and lower vote shares for right-wing parties. Geys et al. (2010) find larger turnout rates as well as the presence of non-ideological 'voter unions' in German municipal elections to be associated with higher efficiency in the provision of local public services. Using data on Italian municipal elections, De Benedetto and De Paola (2014) apply a fuzzy regression discontinuity design to show that an exogenous increase in the quality of candidates to the office of mayor due to a higher wage has a positive effect on electoral participation. Revelli (2013) examines the degree to which decentralization institutions affect the stakes of local elections, and shows that deemphasization of position issues in local elections due to fiscal centralization (in terms of state-imposed tax limits on local authorities) tends in fact to favor voters' party line crossing and, while lowering turnout in local elections, raise the quality and accountability of elected officials. Bordignon et al. (2014) study the effect of decentralization reforms on the selection of politicians and find that in cities with a larger share of autonomous resources the quality of the political class is higher.

This paper aims at adding to the existing literature by investigating whether exogenous changes in the cost of voting affect the degree of voter turnout in municipal elections, and whether those turnout changes eventually have an impact on the quality of urban decision-making and on the performance of cities. The analysis uses data on large Italian cities through the 2000s, and is based on a theoretical model where institutions determine how people vote (i.e., either according to candidates' ideological views or to their valence), and circumstances

(the cost of voting) determine if they actually turn out to vote. It is on the latter aspect that we focus, and exploit exogenous shocks to voter turnout - the presence of concomitant elections for higher levels of government, and weather variation over election times within a given spatial unit (Dell et al., 2014) - to estimate its consequences on Italian cities' performances and elected mayors' traits. The staggered nature of the municipal election schedule and the availability of two consecutive elections for each municipality over the 2001-2010 decade allow us to control for year-specific nationwide influences on local elections, as well as for time-invariant local attitudes towards voting. The results from a number of specifications and quality of policy-making indicators consistently point to a negative causal impact of voter turnout rates on the performance of cities and on the indicators of valence of elected mayors, suggesting that a switch from low to high voter turnout might not always be beneficial.

The rest of the paper is organized as follows. The next section develops a simple theoretical framework to highlight the impact of the cost of voting on voter turnout and candidate selection, and derives a number of testable predictions. Section **3** sets up the empirical strategy, and discusses the two sources of exogenous variation in voter turnout that we exploit and the indicators of city performance that we use. Section **4** presents the estimation results, and section **5** concludes.

2 Theoretical framework

Let two candidates (l, r) run for mayoral office in city n $(n = 1, ..., N)$. The candidate securing the majority of the votes of the city's electorate in a 'winner-takes-all' race sets the one-dimensional policy π^x, $x \in \{l, r\}$, for the subsequent term of office based on his ideology - say, a high versus a low local income tax rate, or large versus small expenditures on local public education. There is no uncertainty about the policy that candidate x will set if elected. The ideology of candidates is common knowledge.[1]

Voting is voluntary, costly, and driven by two expressive motives (Hamlin and Jennings, 2011): a private value or position issue motive (candidate's ideology determining the policy π^x) and a common value motive (candidate's valence).[2]

[1] We abstract entirely here from the issue of how the policy is determined, and assume it is exogenously fixed, as is plausibly the case in a strict party discipline environment. Ansolabehere and Snyder (2000), Kartik and McAfee (2007) and Bernhard, Camara and Squintani (2011) analyze how candidates' personal traits affect their positioning on the ideological spectrum.

[2] This is similar to Ghosal and Lockwood (2009), though in their model voting is instrumental and takes place either according to voters' private preferences or to noisy signals about candidates' competence, while in Krishna and Morgan (2011) the former always dominates the latter. Aldashev (2008) relies on the hypothesis of expressive voting. In his model, citizens are either ideologically motivated or neutral, and both care about the performance (rent extraction) of politicians.

As far as the former is concerned, voter j in city n is ideologically attached to candidate x with probability 0.5, meaning that no candidate enjoys a systematic ideological bias in his favor. Valence is instead a commonly valued issue linked to imperfectly observed candidates' inner characteristics, e.g., competence or probity (Besley, 2005). No instrumental motive is foreseen in voters' decision to cast a vote due to the fact that the electorate is large enough to make the chance of a single vote being decisive in a mayoral election negligible.

Voters' behavior in the wake of an election call can be interpreted as consisting of two stages (Ghosal and Lockwood, 2009). First, the relative weight of ideology and valence issues determines whether, conditional on turning out to vote, individuals vote according to ideology or valence. Second, the comparison of the expressive benefits of voting with the actual costs of voting determines whether people actually turn out to vote.

2.1 Ideology *versus* valence voting

Consider the private value (ideology) *versus* common value (valence) voting decision first. Each voter j has a set of beliefs $\{\iota_j, \kappa_j\}$, with $\iota_j \in \{l, r\}$ being the ideological attachment to either of the candidates' policies reflecting identification with his view of the world, and $\kappa_j \in \{l, r\}$ being voter j's belief about candidates' valence. Assume that candidate x is valent in state of the world $s^x \in \left\{s^l, s^r\right\}$, with the two states of the world being equally likely *ex ante*, and that voter j receives a signal κ_j before the election such that $\Pr(\kappa_j = x | s = s^x) = q > 0.5$. The valence signal may or may not match a voter's ideological preference ι_j. Based on their sets of beliefs, voters can be categorized as follows.

Definition 1 *Voter j is said to be ideological if the expressive benefit of voting by ideology is larger than the expressive benefit of voting by valence. Conditional on turning out, (s)he votes according to ι_j irrespective of κ_j.*

Definition 2 *Voter j is said to be pragmatic if the expressive benefit of voting by valence is larger than the expressive benefit of voting by ideology. Conditional on turning out, (s)he votes according to κ_j irrespective of ι_j.*

Conditional on turning out to vote, ideological voters systematically ignore the candidates' valence signals they receive, and blindly stick to their ideology. Pragmatic voters are instead willing to 'cross party lines' (Casey, 2012), and vote for the candidate they believe to be the most suited to the state of the world that the signal suggests to be the most likely.

2.2 Turnout

Consider the turnout decision next. Based on the comparison between the expressive benefits and the costs of voting, the net benefit of turning out to

vote (e_j) is:

$$e_j = \begin{cases} [i_j + v_j] - c_j & \iota_j = \kappa_j \\ \text{if} & \\ \max\{i_j, v_j\} - c_j & \iota_j \neq \kappa_j \end{cases} \quad (1)$$

where i is the expressive benefit of voting by ideology, v is the expressive benefit of voting for the candidate that is believed to be valent, and c is the cost of voting. A voter turns out to vote ($t_j = 1$) if the net benefit is positive:

$$t_j = 1(e_j > 0) \quad (2)$$

According to equation (1), voters are more likely to turn out if the valence signals match their ideological views ($\iota_j = \kappa_j$) than in the case of clash between valence signal and own ideology ($\iota_j \neq \kappa_j$). We hypothesize that: $v_j = V + \varepsilon_j$, where V is a positive parameter, and ε is independently and uniformly distributed on $[-\sigma, \sigma]$, with $0 \leq \sigma \leq V$. We further assume that the common value (valence) issue is orthogonal to ideology: $E[\varepsilon|i] = 0$. As for ideology, i is assumed to be independently and uniformly distributed on $[0, I]$, with $I > V$, and cumulative distribution function $\Phi = \frac{i}{I}$. As discussed below, the voting cost c_j is allowed to be correlated across voters due to the fact that individuals residing in a jurisdiction face the same or similar environmental conditions and institutional framework.

Figure 1 offers a graphical representation of the forces determining how people vote, and whether they turn out to vote. Voters are first ordered according to the relevance of the private value issue i to them, with Φ on the horizontal axis indexing voters' cumulative distribution function.[3] For simplicity, assume that the valence benefit v_j is constant across voters ($\sigma = 0$), and that $I > 2V$, implying that the majority of voters are ideological.[4] The former hypothesis is more restrictive than is actually needed, but it greatly simplifies the analysis that follows.[5]

Figure 1 first depicts how people vote based on the size of the ideological expressive benefit i (the straight line from the origin of the axes) relative to the valence-related expressive benefit v (the horizontal line at V). The fraction of voters $\Phi = \frac{V}{I}$ in figure 1 have $i_j < V$ and vote pragmatically, i.e., according to the valence signal they receive, while the fraction $1 - \frac{V}{I}$ have $i_j > V$, and vote ideologically, irrespective of the valence signal.

[3] The actual shape and position of the cumulative distribution of the expressive ideological value of voting is likely to vary depending on the institutions governing the local government structure. In particular, the higher the degree of political and fiscal decentralization, the higher the ideological value of voting (Revelli, 2013). In this paper, we take decentralization institutions as exogenously fixed, and focus on the role of circumstances determining the cost of voting.

[4] $I = 2V$ implies that exactly half the electorate is ideological and half is pragmatic. All graphs in this section are drawn by setting: $V = 3$; $I = 8$; $q = 0.7$.

[5] In fact, it is less restrictive than is done in most existing literature, e.g. Krishna and Morgan (2011), where ideology always dominates valence, or Börgers (2004), Krasa and Polborn (2009) and Taylor and Yildirim (2010), where the valence voting motive is absent.

As for the turnout decision (equations (1) and (2)), voters for whom the valence signal matches their ideological views have benefits from turning out to vote as given by the solid straight line **m** $(i + v)$ in figure 1, while 'no match' voters - for whom valence signals are clashing with ideological views - have benefits described by the solid piecewise linear curve **nm** $(\max\{i, v\})$.

Say that the cost of voting is homogeneous across voters at $c_j = c > 0$. According to equations (1) and (2), all voters for whom the benefits from voting (**m** or **nm**) exceed c will turn out, while the others will abstain.

Figure 1 Ideology and valence in voting

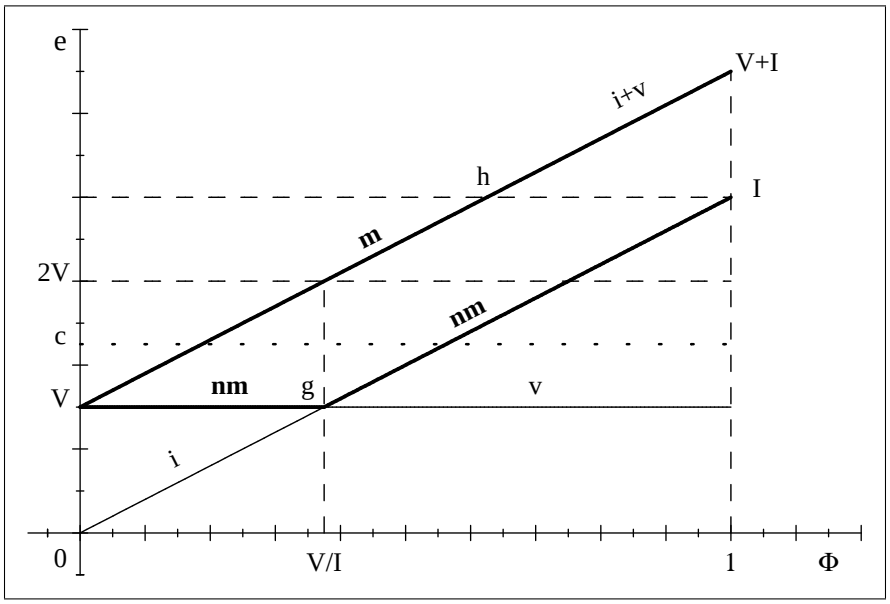


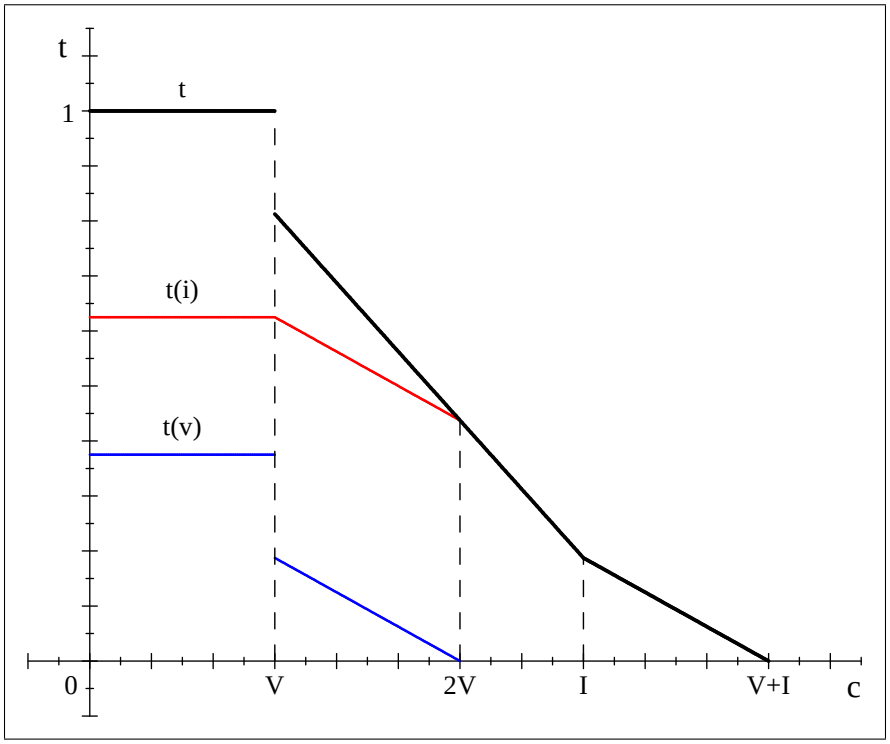
Figure 2 depicts how pragmatic voters' turnout, ideological voters' turnout, and total turnout measured on the vertical axis respond to changes in the cost of voting. First, the effect of the cost of voting on pragmatic voters' turnout $t(v)$ expressed as a percentage of the total electorate is:

$$t(v) = \begin{cases} \frac{V}{I} & c < V \\ \frac{V}{I} - \frac{c}{2I} \quad \text{if} & V < c < 2V \\ 0 & c > 2V \end{cases} \tag{3}$$

As figure 1 shows, all pragmatic voters $\left(\frac{V}{I}\right)$ turn out when $c < V$, while none of them participates when $c > 2V$ even if the signal matches their ideological views. For $V < c < 2V$, the only pragmatic voters that turn out are those for

whom the valence signal matches their ideological views (i.e., are on line **m**), and the total expressive benefits from voting strictly exceed costs: $i_j + V > c$. Given that $\left(\frac{c}{I} - \frac{V}{I}\right)$ voters have $i_j + V < c$ and $\left[\frac{V}{I} - \left(\frac{c}{I} - \frac{V}{I}\right)\right]$ have $i_j + V > c$, and since the electorate is equally split among the two candidates along ideological lines, the proportion of pragmatic voters turning out for $V < c < 2V$ is $\frac{1}{2}\left(\frac{2V}{I} - \frac{c}{I}\right) = \frac{V}{I} - \frac{c}{2I}$.

Figure 2 Turnout



On the other hand, ideological voters' turnout $t(i)$ declines with the cost of voting according to:

$$t(i) = \begin{cases} 1 - \frac{V}{I} & c < V \\ 1 - \frac{V}{2I} - \frac{c}{2I} & V < c < 2V \\ 1 + \frac{V}{2I} - \frac{c}{I} \quad \text{if} & 2V < c < I \\ \frac{1}{2} + \frac{V}{2I} - \frac{c}{2I} & I < c < V + I \\ 0 & c > V + I \end{cases} \tag{4}$$

By the same line of reasoning as for pragmatic voters, and as figure 1 shows, all ideological voters $\left(1-\frac{V}{I}\right)$ turn out for $c<V$, while a fraction $\frac{1}{2}\left(\frac{c}{I}-\frac{V}{I}\right)$ of them - i.e., those for which the valence signal does not match their ideological stance (line **nm**) and $i_j<c$ - abstain if $V<c<2V$. For $c>2V$, some of the 'match' ideological voters abstain too (those that are located close to $\frac{V}{I}$ on line **m** in figure 1, and for whom $i_j+V<c$). As the cost of voting further increases ($c>I$), the only voters participating in the election have a valence signal coinciding with their (intense) ideological views. Finally, ideological voters' turnout falls to zero for $c>V+I$.

As a result of equations (3) and (4), total turnout (t in figure 2) is:

$$t=\begin{cases} 1 & c<V \\ 1+\frac{V}{2I}-\frac{c}{I} & V<c<I \\ \frac{1}{2}+\frac{V}{2I}-\frac{c}{2I} & I<c<V+I \\ 0 & c>V+I \end{cases} \quad \text{if} \tag{5}$$

Based on the above turnout trajectory, consider now how the cost of voting affects the probability that, given the state of the world that is realized, the valent candidate is elected, call it $P(v)$. Let $t(i)^m$ and $t(i)^{nm}$ denote the turnout rates of ideological voters when the signal matches (the candidate they vote for is valent with probability q) or does not match their ideological views (the candidate they vote for is valent with probability $1-q$) respectively. Given that pragmatic voters turn out at the rate $t(v)$ - equation (3) - and always vote 'correctly' according to their valence signals, the probability of electing the valent candidate is:

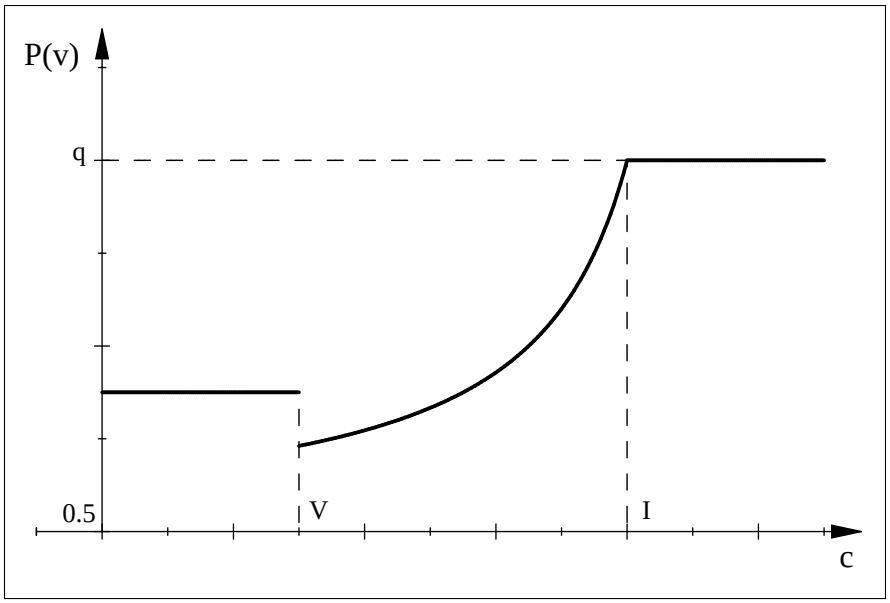
$$P(v) = \frac{\left[t(v)+t(i)^m\right]q+t(i)^{nm}(1-q)}{t} \tag{6}$$

$$= \begin{cases} \left[\frac{V}{I}+\frac{1}{2}\left(1-\frac{V}{I}\right)\right]q+\frac{1}{2}\left(1-\frac{V}{I}\right)(1-q) & c<V \\ \frac{\frac{1}{2}\frac{V}{I}q+\frac{1}{2}\left(1-\frac{c}{I}\right)}{\frac{1}{2}\frac{V}{I}+\left(1-\frac{c}{I}\right)} & \text{if} \quad V<c<I \\ q & c>I \end{cases}$$

Figure 3 draws the probability (6) as a function of the cost of voting. First, $P(v)$ expectedly falls as soon as the cost of voting surpasses V due to the fact that pragmatic voters for whom the signal collides with their (weak) ideological stances (corresponding to horizontal segment Vg in figure 1) abstain, so that 'good voters' are lost to the democratic process because of the rise in the cost of voting. This result is compatible with the widely held view, recently formalized

by Aldashev (2008), that a decline in turnout might worsen the quality of the democratic process and lead to the selection of less valent candidates.

Figure 3 Candidate valence and the cost of voting



For $c > V$, though, the probability of electing the valent candidate increases with c. This is due to the fact that, as c rises, the share of voters casting their votes according to the 'correct' signal increases relative to the share of ideological voters blindly voting against their signals. $P(v)$ keeps on increasing until cost I is reached, where only ideological voters for whom the valence signal matches their ideological views (corresponding to segment $h[V + I]$ in figure 1) turn out to vote. At $c \geq I$ in figure 3, all those who turn out vote according to their valence signal, and $P(v)$ equals q. It is easily verified that $P(v)$ at $c < V$ (where, as figure 2 shows, total turnout is 100%) is strictly lower than q if $q > 0.5$ (the signal is informative). Consequently, the probability of electing the valent candidate is maximized when the voting cost is at least as large as I. Somewhat unexpectedly, maximization of the chances of electing a valent candidate requires both pragmatic voters - i.e., those who always vote according to valence - and ideological voters whose signal does not match their ideological views to abstain, and only the subgroup of radical voters for whom the common value signal matches their private value views to show up at the polls.

3 Empirical analysis

The model in section **2** delivers predictions in terms of the impact of the cost of voting on turnout and election outcomes. This section first sets up the empirical model and the estimation approach to be applied onto data of a longitudinal nature. Next, it discusses the two sources of turnout variation arising from shocks to the cost of voting that we exploit in the empirical analysis. Finally, it illustrates the dataset.

3.1 Econometric strategy

Let v_{ny_n} be an indicator of valence (competence or probity) of the mayor of city $n = 1, ..., N$, with y_n denoting the mayor's vintage (year the mayor was elected). At any point in time, the mayor's vintage y_n varies across cities due to the presence of a staggered election schedule. In particular, the mayor in office in city n in a given year y was elected at time $y_n = y - \triangle y_n$, where $1 \leq \triangle y_n < \overline{\triangle y}$, and $\overline{\triangle y}$ is the statutory length of the term of office. At the election held at time y_n, turnout t_{ny_n} was observed in city n.

Following the theoretical model in section **2**, equation (7) below allows the valence indicator v_{ny_n} to be a function of the turnout rate that was registered in the year y_n election. Moreover, equation (7) includes time-invariant characteristics of the locality (f_n) and time-varying unobservables ε_{ny}, both of which might in principle be correlated with t_{ny_n}:

$$v_{ny_n} = v(t_{ny_n}) + f_n + \varepsilon_{ny_n} \tag{7}$$

First, given that $E(\varepsilon_{ny}|t_{ny_n}) \neq 0$ if, say, expectations about mayor's valence influence the rate of turnout, we need to exploit exogenous circumstances (cost of voting indicators, $\mathbf{c}$) that plausibly affect turnout and are orthogonal to ε_{ny}, and use $\mathbf{c}_{ny_n}$ as instruments for t_{ny_n} based on $E(\varepsilon_{ny}|\mathbf{c}_{ny_n}) = 0$. On the other hand, city's time-invariant characteristics (e.g., social capital) that might be systematically correlated with turnout are eliminated by first-differencing equation (7):

$$\triangle v_{ny_n} = \triangle v(t_{ny_n}) + \triangle \varepsilon_{ny_n} \tag{8}$$

where: $\triangle v_{ny_n} = v_{ny_n} - v_{ny'_n}$ and $\triangle v(t_{ny_n}) = v(t_{ny_n}) - v(t_{ny'_n})$, with $y'_n = y_n - \overline{\triangle y}$. Estimating equation (8) requires using information on the valence of mayors during the previous term of office and on the level of turnout that was registered when the previous term mayor was elected.

Consider now the case where v_{ny_n} is not directly observed, but a manifestation of it (say, π_{ny} in year y) is. π_{ny} might capture some outcome of city government policy (call it 'city performance,' measured along a number of dimensions to be discussed below) that can be partly attributed to the mayor's valence, after accounting for the underlying time-invariant traits of locality n

(h_n) and unobserved time-varying influences on city performance (η_{ny}), as in equation (9):

$$\pi_{ny} = \pi(t_{ny_n}) + h_n + \eta_{ny} \tag{9}$$

After differencing h_n out as in equation (10), endogenous turnout can be instrumented by $\Delta \mathbf{c}_{ny_n}$:

$$\triangle \pi_{ny} = \triangle \pi(t_{ny_n}) + \triangle \eta_{ny} \tag{10}$$

Estimating equation (10) of course poses the same data length requirement as equation (8).

3.2 Exogenous variation in voter turnout

As the recent research discussed in the Introduction suggests, the role of citizens' participation in shaping collective choices in representative democracies is best understood if one can properly address the key question of the causal impact of voter turnout on the characteristics of the candidates that are elected and on the quality of the policies that are actually implemented. It is therefore crucial to rely on sources of variation in voter turnout that are exogenous to the outcome variables that we want to measure.

An ideal, though rare, opportunity to assess the causal effect of voter turnout on government performance is provided by the adoption or repeal of compulsory voting rules. This allows to assess the effects of near-universal turnout relative to the case of sparser voluntary voting. Fowler (2013) exploits the differential adoption of compulsory voting laws across Australian state assembly elections and employs a difference-in-differences approach to show that compulsory voting caused a considerable increase in voter turnout and in the vote share of the Labor Party. Moreover, he exploits the adoption of compulsory voting at the national level, and finds by a synthetic control analysis comparing Australia with a number of OECD countries that the nationwide adoption of compulsory voting caused significant increases in welfare spending.[6] Relatedly, Funk (2010) studies the effect of a reduction in the cost of voting on voting behavior that is offered by the introduction of optional postal voting in Switzerland. She focuses on the effect of the postal voting reform on social incentives and shows that despite the lower voting costs, electoral participation did not increase significantly on average and even decreased in small Swiss communities where the reduction of the social pressure to vote plays a more important role. Complementary evidence is offered by Hodler et al. (2014) who find that the Swiss reform was associated with higher turnout but also with a less desirable social outcome: a change in the composition of voters. The people who cast a ballot were on average less educated and less informed on the political subjects they were asked

[6] A similar approach is employed by Ferwerda (2014) with regard to the differential repeal of compulsory voting laws in Austria.

to express a preference on, an adverse selection that was in turn associated with lower welfare expenditures and higher benefits for special-interest groups.

Given the context of municipal elections over a relatively short time period (a decade) that we analyze here, we cannot rely on any such dramatic change in voting rules that might have a substantial and differential impact on the cost of voting and on the resulting level of voter turnout. In fact, the Italian municipal election system underwent a major reform in the early 1990s, with the introduction of direct election of the mayor, and remained virtually unchanged since. However, we are able to exploit two important sources of exogenous variation in turnout that are linked to the multi-tiered structure of local government and to the geographical nature of our data respectively.

The first exogenous source of variation that we exploit is of an institutional nature, and relies on the predetermined schedule of elections that are regularly held in Italy for representative assemblies other than municipal councils. The existence of a multi-tiered structure of government comprising two further levels of subnational representative assemblies (provincial and regional councils), the national level (two chambers holding contemporaneous general elections), and the European parliament, generates an involved schedule of recurrent elections. Interestingly, those upper-tier elections are occasionally, though not always, held concomitantly as some of the municipal ones. Importantly, the effects of those concomitant elections can be identified separately from nationwide year effects thanks to the fact that municipal as well as provincial and regional elections are staggered, in the sense of taking place in different years. Moreover, even when municipalities happen to face multiple elections in the same year, those elections do not necessarily occur on the same days. This gives rise to a number of overlapping electoral cycles across the national territory, including municipal elections taking place in years where no other major elections are scheduled;[7] or municipal elections taking place in the same year as other major elections, but not on the same day; or finally municipal elections being held concomitantly as nationwide European and Italian parliament elections, or regionwide for some regional assemblies and governors. When elections for different tiers of government are held simultaneously, voters have the chance to cast a vote for all contesting candidates at the same polling station, thus experiencing a substantially lower cost of casting a vote for the relatively less salient election (presumably the municipal one) once they are at the poll to vote for the Prime Minister or regional governor. One can therefore expect turnout to be pushed up exogenously for mayoral elections that happen to take place in those circumstances, and, conditional on the time-invariant characteristics of the localities that can conveniently be controlled for by observing elections that are repeated over time (usually at a five years interval), for reasons that are orthogonal to

[7] By major we refer to European, national and regional elections, with provincial elections usually being much less salient and exhibiting significantly lower voter turnout.

the outcome variables (city performance scores and mayors' valence indicators) that will be later realized.

The fact that concomitant elections can have an influence on voter turnout rates has long been acknowledged in the political science literature. Grouping expectedly less salient to more salient elections has been proposed as a potential remedy to the low level of voter turnout that is registered in the former (especially in the US local government system) when they are held off-cycle (Lijphart, 1997; Hajnal and Trounstine, 2005). However, only recently have systematic attempts been made to precisely measure the effects of holding second-order elections simultaneously as first-order ones. Recent papers have explored in particular the effects of the election timing - on-cycle versus off-cycle - both on the political outcomes of elections and on the policies that are implemented. Anzia (2011) argues that the low voter turnout that usually accompanies off-cycle elections creates a strategic opportunity for organized interest groups having larger stakes in an election outcome and turning out at high rates regardless of election timing, and being able to exert a stronger influence and succeeding to obtain more favorable policies than those made by officials elected in on-cycle elections. Using data on school district elections in the U.S., where teacher unions are the dominant interest group, Anzia (2011) finds that districts with off-cycle elections pay experienced teachers more than districts that hold on-cycle elections. That result is confirmed by a natural experiment created by a Texas law that forced a number of the state's school districts to move their elections to the same day as national elections (Anzia, 2012). The idea is that the change in the state law allows estimation of the causal effect of the switch to on-cycle election timing on average district teacher salary, since teachers and their unions tend to be the dominant interest group in school board elections. Anzia (2012) finds that school districts that were forced to switch to on-cycle elections responded by paying lower salary raises to teachers, supporting the hypothesis that school district representatives elected by a larger number of residents were less responsive to the dominant interest group after the switch. On the other hand, and while adopting a similar empirical strategy, Berry and Gersen (2011) come to different conclusions. They analyze the effects of election timing on voter turnout and policy-making by exploiting a 1980s change in the California Election Code, which allowed school districts to change their elections from off-cycle to on-cycle, and estimate the effect of the resulting changes in voter turnout on a number of education policy outcomes. Their findings suggest that while the election timing reform indeed produced dramatic increases in voter participation in school district elections, the resulting changes in public policy - including teacher salaries and student achievement tests - were modest and mostly statistically insignificant.

The second source of exogenous variation in voter turnout that we will exploit consists of weather conditions on the day municipal elections are held.

The potential effect of the weather on voter participation in elections - and on the outcomes in those elections - has long been conjectured or postulated by media, political practitioners, and political scientists, but it has been relatively little studied empirically. The first empirical work in this sense is Knack (1994). After setting up two competing models predicting an impact from weather conditions on election outcomes - one stressing the increased variance of vote shares in low turnout contests, and the other relying on differential response of party supporters - Knack (1994) merges individual level voting data with meteorological information to conclude, somewhat surprisingly, that the effects of election day rainfall on the probability of voting and on party shares are generally nil, and that cold temperatures are weakly positively associated with turnout rates. Shachar and Nalebuff (1999) and Gatrell and Bierly (2002) find instead a large, negative effect of election day rain on turnout in US presidential elections. Gomez et al. (2007) examine the effect of estimates of rain and snow for each US county based on GIS interpolations from a large number of weather stations on voter turnout in US presidential elections. They find that rain and snow significantly reduce voter participation, and also tend to benefit the Republican party's vote share. Subsequent work by Hansford and Gomez (2010) uses rainfall as an instrument for voter turnout in US Presidential elections to test a larger number of theoretical hypotheses concerning the predictability and anti-incumbency tendencies of elections: they find that higher turnout helps Democratic candidates, and generally results in greater levels of electoral volatility, while low turnout tends to validate the status quo by significantly advantaging the party of the incumbent president. On the other hand, Fraga and Hersch (2010) find that inclement weather (rain storms over half a century of presidential election days) have no substantive impact on turnout in environments that are highly competitive.

More recent European country-level studies employing weather-related variables to explain voter turnout rates lead to mixed results too. Eisinga et al. (2012) use data on Dutch municipal-level turnout in parliamentary elections along with election day weather from the nearest weather stations (rainfall, temperature, sunshine duration) and find significant and large effects of weather conditions on voting, with warm and sunny days witnessing larger turnout. Artes (2014) uses election day rainfall data from local weather stations in Spain as an instrument for municipal-level turnout in Spanish General Elections, and finds that participation is lower and conservatives' vote shares are higher in rainy days. On the other hand, adverse weather conditions do not seem to have any significant effect on electoral participation in Sweden: Persson et al. (2014) use a number of distinct data sources (aggregate turnout data for the 290 Swedish municipalities; individual level data from the Swedish National Election Study; register-based surveys) to show that bad weather has no significant effect on the likelihood of voters to turn out to vote. Finally, Lind (2014) studies the

effect of rainfall on electoral participation and political outcomes in a panel of Norwegian municipalities, and finds that people are less willing to vote in better weather conditions, when the opportunity cost of voting is higher. In fact, the effect of weather conditions on electoral participation seems a priori uncertain. Adverse weather affects both the cost of going to the polls - though plausibly in a far from dramatic way in most circumstances - and the utility of performing alternative activities over what in most countries, including Italy, is an election weekend during Spring through Summer.[8] This makes the final effect of weather conditions in a locality on the level of voter turnout in municipal elections an empirical question, and might explain the diverse results emerged in the literature.

3.3 Data

We use data on municipal elections in the main (provincial borough) Italian cities through the 2000s. The sample includes 82 municipalities for which we have data on all the variables of interest: electoral results, city performance scores, and exogenous determinants of voter turnout (see the data Appendix for details).

As for elections, direct mayoral elections in Italian cities take place every fifth year, with a runoff stage among the two most voted candidates if none gets more than 50% of the votes in the first stage. Voters express a preference for a mayor candidate as well as for a councillor candidate if they wish. 60% of the council seats are assigned to the councillor candidates belonging to the political parties forming the coalition supporting the mayor candidate that is elected. Voting is formally mandatory for all aged above 18, though no sanctions exist for abstainers. The election schedule across the country is staggered, meaning that municipal elections occurred in each of the 2001-2010 years, as shown in table 1. Voter turnout in municipal elections, also reported in table 1, can vary considerably across cities (from a minimum of 61.75% to a maximum of 89.43%).

In terms of city performance, we explore the effect of voter turnout on indicators that refer to the quality of life in the cities in terms of economic, social and environmental aspects, and on elected representatives' characteristics that should proxy their valence. In particular, we measure city performance by the comprehensive index of city environmental performance that is delivered every year by *Legambiente*, an independent nonprofit organization, for Italian province boroughs. The city score is based on a large number of variables including green space availability, air quality in terms of pollutant emissions and its consequences on human health, drinking water quality, public transportation systems, energy consumption and waste recycling performance. The score

[8] On the eve of a controversial popular initiative referendum in June 1991, Prime Minister Bettino Craxi provocatively encouraged voters to head to the beaches instead of the polls.

ranges from 0 to 100, and can be interpreted as the degree to which a city performance approaches a feasible optimal performance. The annually released city ranking attracts considerable media attention, fostering awareness among citizens about the quality of their urban environment and the ability of city governments to adequately preserve it, and the *Legambiente* ranking has the advantage of implicitly constituting an assessment of the performance of local policy-makers in managing their environmental protection tasks (Bianchini and Revelli, 2013). Of course, urban environmental quality is not entirely under control of municipal governments also due to possibly relevant spillovers from nearby jurisdictions. However, given their institutional role in environmental monitoring, regulation and protection, the impact of city governments on environmental performance can be substantial.[9]

Figure 4 illustrates the pattern of performance scores and turnout rates for the 82 cities for which we have complete data on two election waves, the first one taking place (due to an exogenously staggered election schedule) between 2001 and 2005, and the second one taking place five years later, from 2006 to 2010. For each of these cities, we use the performance score that is released three years after the election (e.g., the scores published in 2004 and 2009 for a city holding elections in 2001 and 2006 respectively), and that uses data on the previous two years due to *Legambiente*'s operational lags in information gathering and elaboration of the variables constituting the performance score (see the data Appendix for details).

The upper panel of figure 4 shows the vector of *Legambiente* scores assigned between 2004 and 2008 to the cities that had elections in the years 2001 to 2005 (the first wave of elections) against the rates of voter turnout that were registered in those cities' elections. Similarly, the lower panel of figure 4 shows the performance scores published between 2009 and 2013 against voter turnout in the second election wave (2006-2010). In both cross-sections, it is apparent that turnout and city performance are negatively correlated. The OLS estimate of the effect of voter turnout on city performance is around -0.4 and is statistically significant, meaning that an increase in turnout of ten percentage points is accompanied by 3.6 percentage points worse performance in the earlier wave, and by a 4.2 percentage points worse performance in the later wave. This negative correlation holds also in regressions that include time dummies for the years when turnout was recorded in order to account for year-specific nationwide influences on local elections.[10]

[9] In order to capture an aspect of city performance that may be argued to be more directly under the control of the mayor, we will also use the percentage of separate waste collection in the city (Bordignon et al., 2014).

[10] The results from regressions not reported indicate that governments elected in 2001-2005 achieved better performance scores on average in the first cross-section, where the correlation of voter turnout and city performance is only mildly significant, a result that may depend on several unobserved factors that simple cross-sectional regressions cannot account for.

The negative correlation emerging from figure 4 might be due to unobserved city characteristics that are time-invariant and are correlated both with turnout and with urban environmental performance. Figure 5 draws the difference in performance score between the two measurement waves against the corresponding difference in voter turnout between the elections for each city, thus differencing away any fixed city characteristic (as in equation (10)). Again, figure 5 exhibits negative correlation between city performance and voter turnout, and the results from a simple OLS regression on the differenced data indicate that higher turnout is accompanied by worse city performance: an increase in electoral participation by ten percentage points is accompanied by an around 4 percentage points lower performance score.[11] Of course, this is only suggestive of a genuinely causal effect of turnout on urban performance, an issue we turn to in the next section.

4 Results

In order to estimate the effect of voter turnout on city performance, we first estimate equation (10) by instrumental variables (IV), where city performance is proxied by the environmental performance index discussed above. For each municipality, we assign to the two election events that we observe through the decade (the first one during the election wave 2001-2005, and the second one during the subsequent election wave 2006-2010, depending on the municipality-specific election schedule) the environmental performance scores that were released on the third year following each of those elections respectively. Besides allowing us to remove municipal time-invariant characteristics by first-differencing across the two waves, this timing structure fully accounts for a substantial revision in the construction procedure of the Legambiente index (basically a reweighting of its multiple components) that occurred between the two measurement waves.

As argued above, the presence of concomitant regional, general and European parliament elections, as well as detailed information on weather conditions (rainfall) on the election day, provide a set of instruments for voter turnout. Table 2 reports data on the instruments we use, showing for each year how many municipalities held on-cycle elections and in how many cities it was raining on the election day. In Italy, people were called at polls three times to vote for the national government between 2001 and 2010 (in 2001, 2006 and 2008), twice to

[11] There is substantial variation in the variables of interest: electoral participation has decreased by three percentage points on average across the two election waves (2001-05 versus 2006-10), recording a maximum decrease of 21 percentage points in Rimini and a maximum increase by 11.5 percentage points in Pordenone; the Legambiente index has decreased a little on average (by -0.6 points), but its change differed across municipalities (its standard deviation reaches almost 8 points) ranging between minus 15 points in Bergamo and plus 22 points in Belluno.

vote for the European parliament (in 2004 and 2009) and, if no early break-up occurred, twice to cast a ballot for lower level elections (municipal, provincial and regional) that take place every five years according to a staggered election schedule. In our sample of 164 municipal election events, national elections occurred in the same day as municipal elections in 24 instances, while European and regional elections were held concomitantly as municipal elections in 55 and 13 instances respectively. We also control for "other elections" that occurred in 11 cases when voters expressed preferences for local governments at the provincial level only. As to weather conditions, the last column of table 2 shows that on the election day it was raining in 45 cases, the dichotomous variable 'rain' taking value 1 if the election day was wet, zero otherwise.[12]

Table 3 reports first stage estimates of IV estimation of equation (10) where the dependent variable is the index of environmental performance. The instruments' set in the first column of the table only includes dummy variables for concurrent upper tier elections as municipal ones. The results show that the strongest determinant of voter turnout is the presence of the arguably most salient national elections, which significantly enhance voting for municipal offices by almost nine percentage points. Instead, concomitant regional, European, and other elections are estimated to have no significant effect on turnout.

In column (2) of table 3, we use weather conditions on the election day as the sole instrument for voter turnout. Electoral participation is significantly higher - over three percentage points - in rainy election days, a result in line with Knack's (1994) finding of a positive association of cold election day temperatures and voter turnout. This first stage evidence on the relationship between electoral participation and weather conditions in Italy complements the case studies on the effect of rain on turnout cited in section 3 by suggesting that, in the Italian case, adverse weather conditions favor turnout in municipal elections, maybe due to the loss of alternatives that a sunny day in late Spring offers. From a statistical point of view, however, the election day weather dummy has low explanatory power due to little variation in rainfall events in the sample (in 10 of these municipalities, weather conditions were the same in the two election rounds we consider).

Column (3) uses the whole set of instruments: the weather indicator has no longer a significant effect, with the concomitant national election dummy retaining a large positive effect on turnout. As the statistics at the bottom of the table indicate, the instruments in column (3) are jointly significant, and strong enough to foster confidence in the reliability of the second stage regressions

[12] Similar results can be obtained using rainfall in millimeters. The choice to use a dummy variable is motivated by the fact that information on rain is collected from different sources (see the data Appendix for details). While national sources provide validated data, regional weather indicators are not, thus any data-merge would suffer from measurement errors. Moreover, one may argue that the intensity of rainfall has different effects in different areas of a country.

(their partial R-squared is equal to 63%).

Estimates of the second stage of the model are reported in the first column of table 4, using the set of instruments that includes concurrent elections dummies and weather conditions. Interestingly, and consistently with our model, voter turnout instrumented by the variables proxying the cost of voting is estimated to have a negative and significant effect on city performance, with a ten per cent increase in voter turnout being estimated to cause almost a 7 per cent fall in the city performance score. The null hypothesis of the Hansen test of overidentifying restrictions that all the instruments are valid is not rejected, and the value of the Kleinberger-Paap statistic that tests for weak identification indicates that the instruments are not weakly correlated with the endogenous turnout variable.[13]

In the subsequent columns of table 4 we test the robustness of this finding by considering other potentially relevant sources of heterogeneity across Italian municipalities. In column (2) we include a set of variables controlling for socio-economic factors that are measured at the regional level and are arguably exogenous to voter turnout at the municipal level. In our data the concentration index of the population living in the main cities is positively associated with better city performance, maybe because social pressure towards participation is stronger where the population is less sparse or diverse (Funk, 2010). The effects of indicators of the demographic structure, such as the dependency ratio (i.e., the ratio of people not in the working age to the labor force), and the unemployment rate, are instead not precisely estimated, as is the variable "second term" that takes value 1 if the incumbent mayor wins the elections for the second time in a row (in our sample this is the case in 54 elections), zero otherwise.

The results in columns (3) and (4) of table 4 confirm that city performance is decreasing in voter turnout both in the full sample and in specifications where we consider two sub-samples of Italian municipalities: in column (3) we exclude the Italian municipalities whose population is larger than 200,000 inhabitants as a check for the possibility that national elections, the stronger instrument in our set, may affect the choice of the candidates. This could be arguably the case when a political party decides to choose a competent and well-known (to the potential pool of voters) candidate at the local level to attract more votes in the national elections, too. A choice that is more likely to be relevant in the biggest city centers, where elections receive higher media attention. In column (4), we exclude instead the Italian regions that are constitutionally entitled with broader autonomy (home rule regions). Our finding of a negative impact of voter

[13] To foster confidence in the strength of the instruments, the Kleibergen-Paap Wald rk F statistic should be comparable to the critical values (in the order of 10) computed by Stock and Yogo (2005) for the Cragg-Donald statistic it generalizes when the assumption of i.i.d. standard errors is dropped, as in the case of robust standard errors (see Baum et al., 2007).

turnout on city performance scores is robust in both of these sub-samples.[14]

Next, in column (5) we present estimates from using an alternative timing of performance measurement. In particular, the vector of Legambiente scores that is published in 2008 is used to measure the performance of city governments elected during the first wave 2001-2005, and the vector of Legambiente scores published five years later, in 2013, is taken as a measure of performance of the governments elected during the second wave 2006 to 2010. This implies that, for a performance score vector that is released in a given year y (based on performance indicator data measured during years $y-2$ and $y-1$), the governments that won the elections from year $y-7$ to year $y-3$, depending on the election schedule in the various localities, are deemed responsible for the city ratings released in year y. Table A2 in the Appendix summarizes the sequence of events for the two waves of city performance scores that we use (2008 and 2013). The effect of voter turnout on city performance turns out to be negative when employing this specification too, although it is not statistically significant any longer.

Finally, in table 5 we perform the same empirical analyses of table 4 using the component of the Legambiente index that refers to the percentage of separate waste recycling. This narrower measure may have the advantage of capturing a dimension of policy that is under more direct control of the elected mayor (Bordignon et al., 2014). The results show that our main finding of a negative and significant effect of instrumented electoral participation on policy outcomes is robust in all specifications when we use the percentage of separate waste as dependent variable. Among the control variables, the positive and significant effect of the second term variable on waste recycling suggests that office duration enhances city performance along this policy dimension.

4.1 Turnout and valence

In order to test whether voter turnout has an effect on the quality of the candidates that are elected, we take a number of indicators of mayors' 'valence'. The main difficulty in dealing with valence consists in defining which characteristics of the mayor are actually relevant and to find good proxies for them. In principle, mayors' valence might refer both to the competence and to the probity dimension of the candidates that voters consider common values. However, the available data only allow us to build proxies of competence, due to the lack of candidates' criminal records. In particular, we use data from the Italian Ministry of Interior Affairs on individual characteristics of the elected candidates

[14] These results hold also when we consider only the regions in the Center-North of Italy, thus excluding the South and the islands, where on average the Legambiente index records a lower value.

such as education and professional status.[15]

We first exploit information on mayors' education. While of course the level of education is far from representing an ideal proxy of commonly valued mayor's valence, still holding a college degree might be viewed as a signal of competence. We know for all mayors whether they hold a primary, secondary or undergraduate degree, but unfortunately we have no information about the kind of programme they attended at the undergraduate level, nor on any graduate or post-graduate course. We therefore build a dichotomous "education" variable taking value 1 if the mayor has a bachelor degree and zero otherwise. In our sample, the candidates that run for the office of mayor in the main Italian municipalities and won hold a bachelor degree in 127 cases out of 164. The estimation results are reported in table 6, column (1), where it appears that the effect of turnout on the probability to elect a mayor who holds a bachelor degree is negative but not significant at conventional levels (the p-value is 0.16).

The next three columns of table 6 use indicators of professional experience of the elected candidates. Information on occupational status before election is quite detailed in our dataset. We are able to identify various types of white-collars, entrepreneurs, teachers, engineers, servicemen, lawyers, scientists, doctors, directors, dealers, writers, and pensioners. To build a measure of valence related to the profession of the mayor, we follow a classification by the Italian Statistical Institute (ISTAT) which identifies a group of professions on the basis of the governance skills they allow to develop and then to apply. According to that classification, the level of competence needed to define and implement strategies at the policy, institutional, and economic level is the one that can be acquired by people working at high levels of government bodies, public administrations, the judicial system, the university, international organizations, public and private companies. This way of defining "high competence" fits well our purpose of measuring valence, because it considers the level of knowledge required to perform specific tasks such as leading and managing public activities. The dependent variable in the second column of table 6 is a dichotomous variable that takes value 1 if the mayor was employed in one of the above mentioned high-skilled jobs, zero otherwise. To control for endogeneity of electoral participation, we use the vector of concurrent elections dummies and the weather (rainfall) indicator that appear as excluded instruments in the third column of table 3. The model we estimate is a linear probability model with fixed locality effects.[16] The IV estimation results in column (2) of table 6 indicate that

[15] We also experimented with a number of mayor candidates' characteristics including age and gender, none of which, though, turn out to be significantly affected by the rate of voter turnout (results available on request).

[16] Despite the arguments against the use of linear probability models with binary dependent variables, there is consensus in the literature about considering them preferable to non-linear models when working with panel data and instrumental variables. In those cases, logit and probit's outcomes should be indeed converted into marginal effects that would become difficult to deal with both for computational and interpretational reasons (for a discussion see Angrist

turnout has a negative impact on the probability that "high professional status" mayors are elected, thus confirming that where participation is low due to high costs of voting, it is more likely to elect a competent candidate. This finding holds in column (3), where we consider a more restrictive definition of such profession-related valence that does not include entrepreneurs, who may be argued to have a conflict of interest as public administrators. Finally, the same result emerges in the last column of table 6 too, where the group of high competence candidates is enlarged to include the mayors that were classified as "persons having ceased to work" at the time of the election.

5 Concluding remarks

Being generally viewed as a symptom of democratic deficit and a cause of biased policy choices, low voter turnout tends to be a reason for widespread concern. This paper has addressed the question of whether low voter turnout rates in local elections can really be deemed responsible for poor selection of candidates and weak performance of cities, and whether institutional remedies aimed at raising voters' participation in local elections should be considered, also in the light of the growing socio-economic role of cities and their potential impact on people's lives.

We have first built a model of voluntary and costly expressive voting, where the relative weight of ideology and valence issues over voting costs determines how people vote, and if they actually turn out to vote. The model indeed predicts, in line with the conventional rational calculus approach, that the cost of voting depresses voter turnout. However, it also shows that high voting cost/low turnout elections tend to be characterized by a large share of voters for whom the common value signal on candidates' valence (competence or probity traits that are valued by the whole electorate) matches their private value views. This implies that higher voting costs can in fact raise the chances of selecting more valent candidates, and lead to the implementation of more successful policies.

We have tested the model on Italian municipalities' election data, where we have exploited exogenous variation in voter turnout rates through the 2000s arising from two distinct sources. The first is the presence, that is typical of multi-tiered structures of government, of recurrent overlapping election cycles generating the possibility of concomitant elections for other levels of government (regional, national and European parliament elections) raising the stakes and reducing the cost of casting a vote for a second-order (municipal) election. The second is the long referred to, but relatively little systematically studied, turnout effect of weather conditions (rainfall) on the election day.

Measuring city performance by a unique indicator of urban environmental quality, and proxying mayors' valence by variables reflecting their education,

and Pischke, 2009).

competence, and professional experience, the instrumental variables estimation results consistently point to a negative causal impact of voter turnout rates on the performance of cities and on the professional dimension of mayors' valence indicators, thus suggesting that a switch from low to high voter turnout that would be favored by a decline in voting costs might not always be beneficial in terms of candidate selection.

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Data Appendix

The sample compiled for the paper includes 82 municipalities for which we were able to collect data on all the variables relevant to our analysis in both cross-sections: electoral variables, city performance, weather conditions. Data on electoral outcomes and mayor's characteristics in Italian municipalities are from the Ministry of Internal Affairs. The cities in the sample are the main municipalities (and administrative centers) in the province boroughs they belong to. Data refer to first-round election outcomes between 2001 and 2010. We consider two 5-year non overlapping cross-sections (2001-2005 and 2006-2010). If we observe more than one observation in a cross-section, due to an early break-up of the local government, we keep the more recent one. In the sample, elections took place every five years in 68 municipalities, while 14 municipalities held elections before the natural end of the term of office. The online archive of the Italian Ministry does not include complete data for elections in autonomous regions. Our sample includes Sardegna and Friuli - Venezia Giulia, and not Sicilia (where up to year 2005, elections were held in the Fall and only thereafter in the Spring/early Summer as in the other regions), and the two bilinguistic regions Valle d'Aosta and Trentino Alto Adige. The ordinary region Calabria is not included due to its high political instability.

Data on city performance are collected by *Legambiente*, an Italian nonprofit organization that yearly publishes a report, entitled *"Ecosistema Urbano,"* on the environmental quality of the main Italian municipalities. In our main specifications, we use the *Legambiente* score released three years after the elections we focus on took place. Since the score published at the end of each year gathers information on city performance in the previous two years, this means that, for instance, to measure the performance of a local government that won the elections in 2010 we use the score released in November 2013 that measures city performance in 2012 (and considers 2011 data to fill missing values in a few sub-categories of the index only).

The main source of information on weather conditions is the Italian Weather Archive online ("*Archivio Meteo Italia*"). Where not available in the main online database, data were provided by the weather service and forecast offices of the regional agencies for environmental protection ("*Agenzia Regionale per la Protezione dell'Ambiente, ARPA"*). We gratefully acknowledge *ARPA Piemonte*, *ARPA Lombardia*, *Regione Abruzzo - Direzione LL.PP e Protezione Civile*, *ARPA Veneto*, *Regione Umbria - Idrografico Regionale*, for their assistance.

Control variables are from the Italian Statistical Institute (*ISTAT*). The concentration index of the population living in big cities, the dependency ratio, and the unemployment rate are measured at the regional level. Our main results would not change if we used the concentration index and the dependency ratio

at the provincial level, while the unemployment rate is only available for 2002-2011 at the regional level (for municipalities who had elections in 200, we used the 2002 observations), because a change in the compilation strategy does not allow to use data at the provincial level.

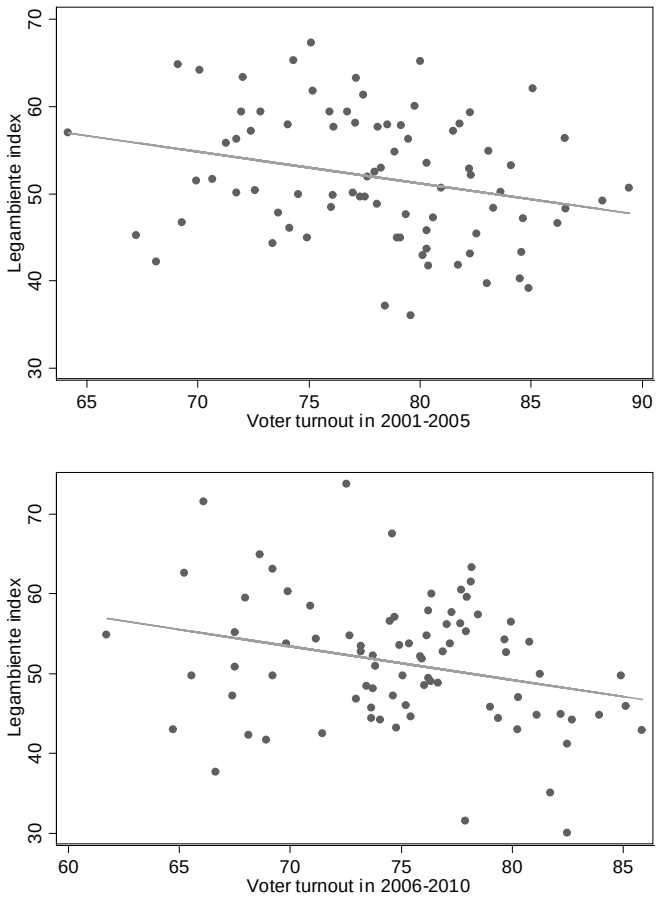
Table A1 Descriptive statistics

Variable	Observations	mean	std. dev.	min	max
Voter turnout	164	76.58	5.39	61.75	89.43
Legambiente index, 2 years after	164	51.57	7.66	29.98	73.71
Legambiente index, in 2008 and 2013	164	51.40	8.83	25.40	74.63
Waste recycling, 2 years after	164	31.92	16.10	1.00	72.10
Waste recycling, in 2008 and 2013	164	36.29	17.38	3.70	79.00
Concentration index, regional	164	46.43	25.38	22.67	121.40
Dependecy ratio, regional	164	51.50	3.58	42.50	61.60
Unemployment rate, regional	164	6.55	3.43	2.54	17.57
Second term	164	0.33	0.47	0	1
Length of office	164	3.15	1.35	1	5
Education, BA degree	164	0.77	0.42	0	1
Profession, high competence	164	0.20	0.40	0	1
Profession, less entrepreneurs	164	0.14	0.35	0	1
Profession, plus retired	164	0.24	0.43	0	1

Table A2 Schedule of events

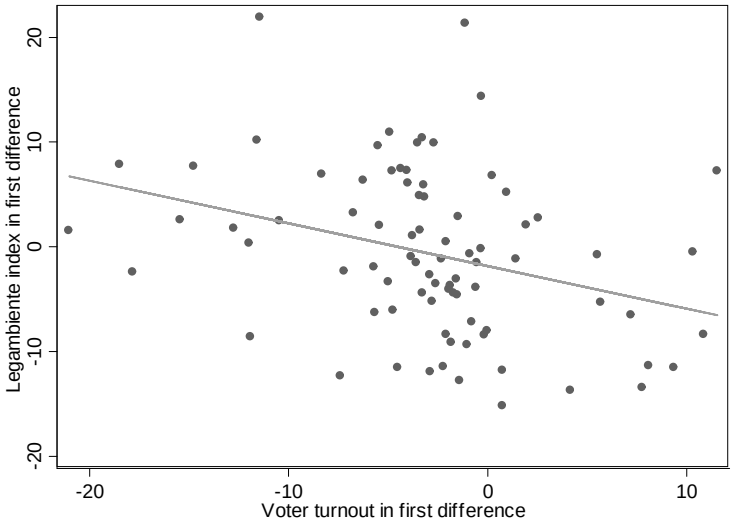
elections	performance measurement	
First observation wave		
2001	2006 - 2007	$\rightarrow \pi_{2008}$
2002	2006 - 2007	$\rightarrow \pi_{2008}$
2003	2006 - 2007	$\rightarrow \pi_{2008}$
2004	2006 - 2007	$\rightarrow \pi_{2008}$
2005	2006 - 2007	$\rightarrow \pi_{2008}$
Second observation wave		
2006	2011 - 2012	$\rightarrow \pi_{2013}$
2007	2011 - 2012	$\rightarrow \pi_{2013}$
2008	2011 - 2012	$\rightarrow \pi_{2013}$
2009	2011 - 2012	$\rightarrow \pi_{2013}$
2010	2011 - 2012	$\rightarrow \pi_{2013}$

Figure 4



Correlation between urban environmental performance (Legambiente index) and voter turnout. The Legambiente index is measured two years after the election.

Figure 5



Correlation between Δ urban environmental performance (Legambiente index) and Δ voter turnout. The Legambiente index is measured two years after the election.

Table 1 Election data: 2001-2010

Elections		Turnout			
Year	number	mean	st.dev.	min	max
2001	18	81.25	7.21	64.18	89.43
2002	21	76.65	5.35	67.25	84.51
2003	8	73.86	3.88	69.11	78.87
2004	27	78.61	2.70	72.85	82.32
2005	8	76.66	2.55	72.04	80.97
2006	17	73.33	6.33	64.74	85.16
2007	20	74.06	6.30	61.75	83.96
2008	9	80.53	3.75	73.66	85.86
2009	28	75.84	2.66	69.83	82.21
2010	8	72.97	3.92	67.98	80.25

Table 2 Concurrent elections and rainy days

Year	European elections	National elections	Regional elections	Provincial elections	Other elections	Rainy day
2001	0	16	0	2	1	1
2002	0	0	0	3	3	10
2003	0	0	0	1	1	0
2004	27	0	0	22	0	2
2005	0	0	7	1	1	0
2006	0	0	0	1	1	1
2007	0	0	0	3	3	15
2008	0	8	0	2	0	7
2009	28	0	0	19	0	11
2010	0	0	6	1	1	0

Notes: Elections at the provincial level were held concurrently with municipal elections in 56 instances. The "other elections" dummy variable that we use in the regressions takes value zero when concurrent municipal and provincial elections occurred on the same day as higher-level (European, national or regional) election, too.

Table 3 Voter turnout and city performance, first stage, IV-FD estimation

Dependent variable: Voter turnout			
Column:	(1)	(2)	(3)
National elections	8.941***		8.948***
	(1.160)		(1.186)
European elections	0.316		0.317
	(1.601)		(1.617)
Regional elections	0.722		0.721
	(1.024)		(1.036)
Other elections	-5.738		-5.739
	(3.779)		(3.799)
Rain		3.065**	-0.020
		(1.254)	(0.663)
Statistics:			
Partial R-squared	0.630	0.064	0.630
F statistic	21.11	5.97	16.78
	[0.00]	[0.02]	[0.00]
Municipalities	82	82	82

Notes: Estimation method: IV - first differences estimation. Robust standard errors in parenthesis, (*) (**) (***) denote significance at the (10) (5) (1) percent level. Statistics computed by the ivreg2 Stata module (Baum et al., 2007), definitions: Partial R-squared of excluded instruments; F statistic of the joint significance of the instruments, p-values in square brackets.

Table 4 Voter turnout and city performance, second stage, IV-FD estimation

Dependent variable: Legambiente index					
Sample:	All	All	No big cities	Ordinary regions	All
Column:	(1)	(2)	(3)	(4)	(5)
Voter turnout	-0.676***	-0.630***	-0.724***	-0.738***	-0.057
	(0.157)	(0.160)	(0.181)	(0.158)	(0.192)
Concentration		0.482*	0.502*	-0.554	0.293
		(0.251)	(0.278)	(0.572)	(0.318)
Dependency ratio		0.265	0.115	-0.329	-0.358
		(0.613)	(0.691)	(0.585)	(0.525)
Unemployment rate		-0.371	-0.246	0.113	1.391***
		(0.496)	(0.531)	(0.487)	(0.534)
Second term		0.372	0.392	-0.256	0.424
		(0.933)	(1.057)	(0.863)	(0.914)
Length of office					-1.613**
					(0.671)
Statistics:					
Hansen's J statistic	4.023	4.217	3.960	4.406	2.973
	[0.403]	[0.377]	[0.411]	[0.354]	[0.562]
Weak identif. test	16.78	16.43	16.34	16.69	16.18
Municipalities	82	82	70	75	82

Notes: Estimation method: IV (first differences) estimation. Robust standard errors in parenthesis; (*) (**) (***) denote significance at the (10) (5) (1) percent level. Statistics computed by the ivreg2 Stata module (Baum et al., 2007), definitions: Hansen's J statistic of over-identifying restrictions, under the null that all the excluded instruments are valid instruments, Chi-squared p-values in square brackets; Kleibergen-Paap rk Wald F statistic of weak identification. The instruments' set includes the variables listed in the third column of Table 3 in columns (1) to (4) and (5). In column (5) the dependent variable is measured according to the timing presented in Table A2.

Table 5 Voter turnout and city performance, second stage, IV-FD estimation

Dependent variable: Waste recycling					
Sample:	All	All	No big cities	Ordinary regions	All
Column:	(1)	(2)	(3)	(4)	(5)
Voter turnout	-0.688**	-0.630**	-0.763**	-0.774***	-0.516*
	(0.279)	(0.280)	(0.311)	(0.299)	(0.285)
Concentration		0.356	0.215	-1.551	0.391
		(0.652)	(0.704)	(1.155)	(0.682)
Dependency ratio		-0.673	-0.708	-1.687	-3.522***
		(1.095)	(1.174)	(1.085)	(1.199)
Unemployment rate		-0.205	-0.356	0.971	0.199
		(1.095)	(1.217)	(0.943)	(1.174)
Second term		2.781*	3.747**	2.692*	1.058
		(1.628)	(1.863)	(1.571)	(1.874)
Length of office					-1.301
					(1.366)
Statistics:					
Hansen's J statistic	5.226	6.504	4.578	4.558	2.134
	[0.265]	[0.165]	[0.333]	[0.336]	[0.711]
Weak identif. test	16.78	16.43	16.34	16.69	16.18
Municipalities	82	82	70	75	82

Notes: Estimation method: IV (first differences) estimation. Robust standard errors in parenthesis; (*) (**) (***) denote significance at the (10) (5) (1) percent level. Statistics computed by the ivreg2 Stata module (Baum et al., 2007), definitions: Hansen's J statistic of over-identifying restrictions, under the null that all the excluded instruments are valid instruments, Chi-squared p-values in square brackets; Kleibergen-Paap rk Wald F statistic of weak identification. The instruments' set includes the variables listed in the third column of Table 3 in columns (1) to (4) and (5). In column (5) the dependent variable is measured according to the timing presented in Table A2.

Table 6 Voter turnout and valence, IV-FD estimation

Dep. var.:	Education (BA)	Profession (high competence)	Profession (no entrepreneurs)	Profession (including retired)
Column:	(1)	(2)	(3)	(4)
Voter turnout	-0.008	-0.018**	-0.019**	-0.026**
	(0.006)	(0.009)	(0.009)	(0.011)
Concentration	0.002	-0.003	-0.003	-0.022
	(0.004)	(0.004)	(0.005)	(0.012)
Dependency	0.041	0.012	0.019	-0.026
	(0.029)	(0.030)	(0.029)	(0.041)
Unemployment	0.009	-0.003	-0.003	0.010
	(0.027)	(0.031)	(0.030)	(0.037)
Second term	-0.043	-0.033	0.003	0.016
	(0.039)	(0.047)	(0.039)	(0.057)
Statistics:				
Hansen's J stat.	4.019	6.788	4.260	4.678
	[0.403]	[0.148]	[0.372]	[0.322]
Weak ident. test	16.43	16.43	16.43	16.43
Municipalities	82	82	82	82

Notes: Estimation method: IV - first differences estimation. Robust standard errors in parenthesis, (*) (**) (***) denote significance at the (10) (5) (1) percent level. Statistics computed by the ivreg2 Stata module (Baum et al., 2007), definitions: Hansen's J statistic of over-identifying restrictions, under the null that all the excluded instruments are valid instruments, Chi-squared p-values in square brackets; Kleibergen-Paap rk Wald F statistic of weak identification.